September 2022

Update

A free email newsletter of the Oklahoma Space Alliance

Oklahoma Space Alliance

A Chapter of The
National Space Society

Aurora Australis from ISS

Credit: Twitter/Samantha Cristoforetti

September 2022 OSA Meeting

Saturday, September 10, 2022

2:00 PM

Cliff & Claire McMurray's House

2715 Aspen Circle, Norman, OK 73072

405-863-6173

Program— Space News and Events

Website: http://osa.nss.org

Quote of the Month

"We need to do stuff that people think can't be done." – Impulse Space CEO Tom Mueller

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Update

September 10 2022

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The *Oklahoma Space Alliance Update* is a bi-monthly newsletter of the Oklahoma Space Alliance a chapter of the National Space Society, a non-profit organization headquartered in Washington, D.C. The address of **OSA** is **102 W. Linn, #1, Norman, OK 73071**.

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Articles may be submitted by U.S. mail or electronically. Articles may be sent to the Editor at 121 South Creekdale Drive, Norman, OK 73072 or to david.sheely51@gmail.com. Each submission should include the author's name and either e-mail address or phone number (for verification only). A text or Microsoft Word file is preferred. Please contact the Editor by phone, e-mail or texting before mailing your information.

Wargames

Credit: U.S. Space Force

Space Training and Readiness Command's 392nd Combat Training Squadron runs Space Flag, a military exercise modeled after the Air Force's Red Flag. Its most recent exercise, Space Flag 22-3, was conducted August 8-August19 at Schriever SFB in Colorado. The participants were about 120 Space Force personnel from multiple U.S. Space Force Deltas with counterparts from the U.S. Air Force and the U.S. Army. A "blue cell" of Space Force guardians tried to provide satellite-based services like GPS navigation and communications for a simulated joint-service military operation while a "red cell" of aggressors sought to disrupt those services using tactics like those expected to be employed by U.S. adversaries. The Ukraine War is demonstrating the utility and potential vulnerability of commercial satellites in wartime; a new report by Aerospace Corp. warns that it won't be just military satellites that get shot at if space conflict gets kinetic, so they'd better be figuring out how to deal with that.

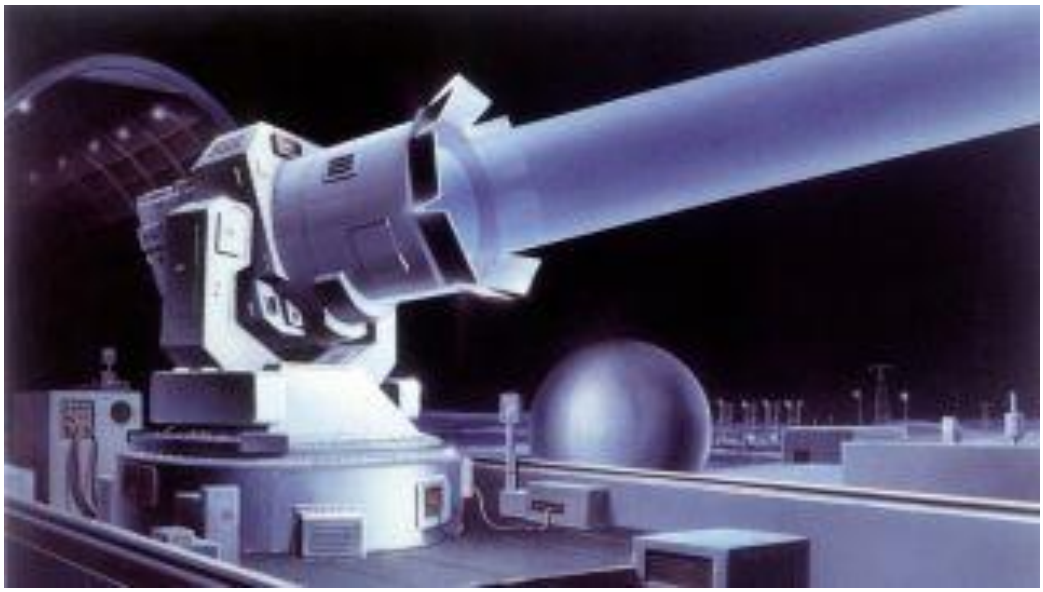
Articles: https://spacenews.com/space-force-wargame-challenges-satellite-operators-to-think-critically/

https://www.space.com/space-force-space-flag-simulated-orbit-combat

https://www.space.com/ukraine-war-strategic-importance-private-satellites

https://spacenews.com/report-industry-has-to-face-reality-that-commercial-satellites-will-be-targets-in-war/

Hey, You Could Put an Eye Out With That Thing



Credit: U.S. National Archives

Russia appears to be building a laser for the purpose of ***permanently*** blinding (as opposed to merely “dazzling”) enemy satellites – that would be ours – by burning out their optics. The construction site for the laser, named Kalina, is the Ministry of Defense's Krona space facility near Zelenchukskaya in Russia's far southwest. ASAT activity is on the rise. General David D. Thompson, vice chief of space operations for Space Force, told The Washington Post in 2021 that U.S. satellites are under attack "every single day" and that the United States is "really at a point now where there's a whole host of ways that our space systems can be threatened." The Washington Post describes the current state of affairs as a "shadow war in space".

Article: https://www.space.com/russia-anti-satellite-laser-facility-satellite-photos

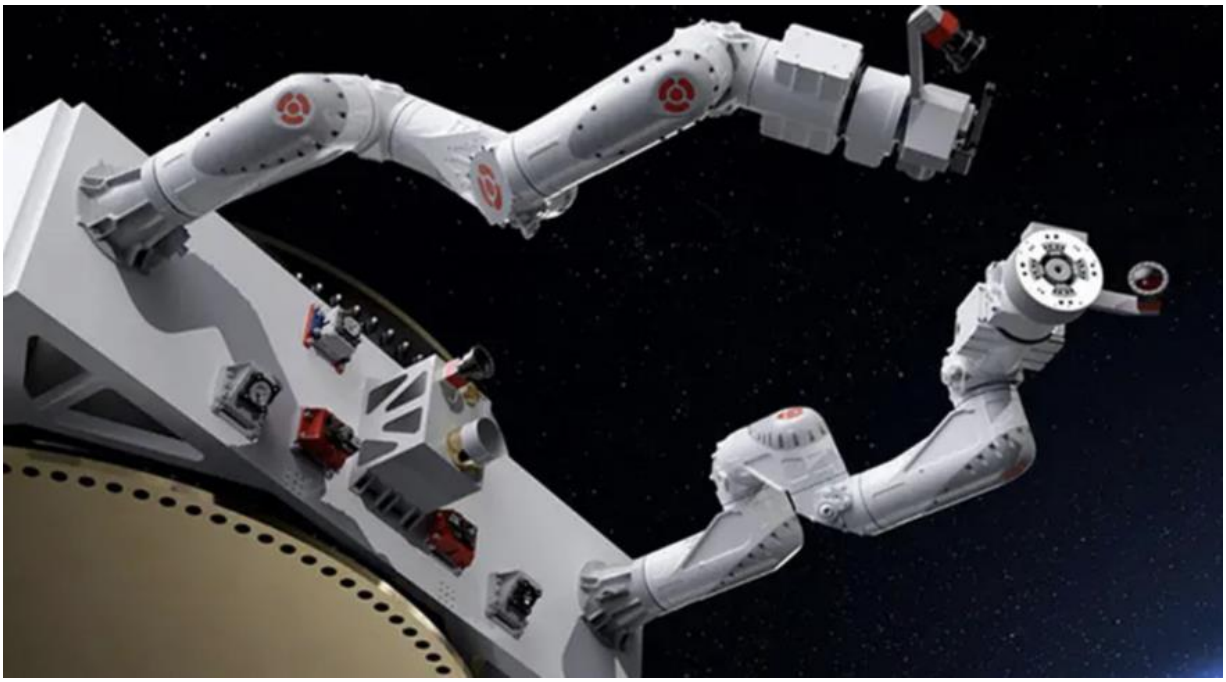
Hey, Buddy, Eyes on Your Own Homework!

Credit: Russian Ministry of Defense

The Pentagon is very, ***very*** unhappy with the maneuvers of a Russian spy satellite. Kosmos 2558 was launched on August 1 and it's close enough to count the nose hairs on a classified American reconnaissance satellite that launched in February. An independent Netherlands-based satellite tracker reported that as of August 2 Kosmos 2558 is in virtually the same orbit as the American satellite, with a difference of just 0.04 degrees and a separation of 37 miles (60 km).

Article: https://www.space.com/russia-inspector-satellite-kosmos-2558-irresponsible-behavior

Military Interest in GEO Servicing Ops



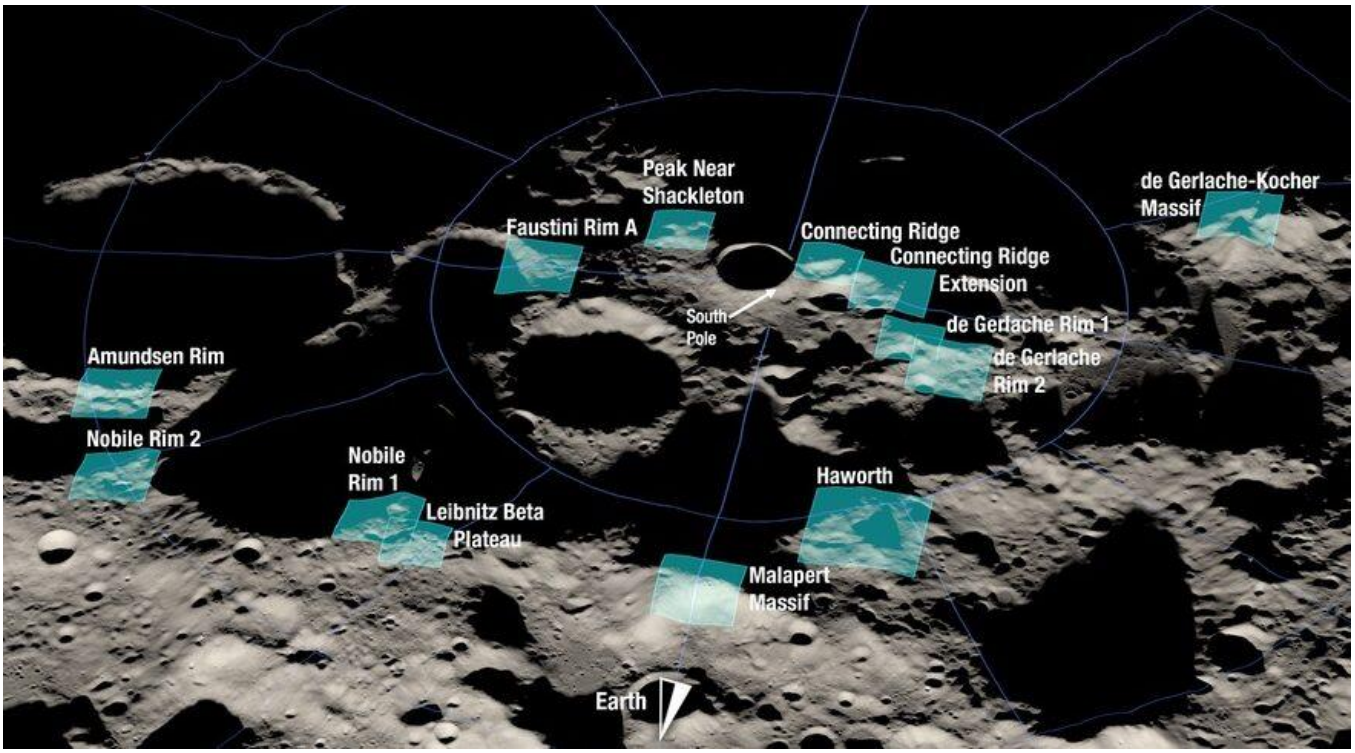
Credit: Motiv Space Systems

Orion Space Solutions announced on August 16 it won the $44.5M U.S. Space Force contract for the Tetra-5 mission to develop three small satellites for a demonstration of on-orbit services in GEO. The Defense Innovation Unit (DIU), a DoD agency established in 2015 to help bring privately funded innovation into military programs, is also eyeing GEO demo projects. DIU is reviewing bids for RAPID (Readily Accessible Propellant In Diverse Orbits) a project to demonstrate in-orbit refueling across several orbits; the Modularity for Space Systems (M4SS) project has already made some awards. In March, DIU selected Motiv Space Systems, Maxar Technologies and Tethers Unlimited to prototype robotic arms and other modular systems that could be attached to servicing vehicles operating in GEO. The companies have to deliver prototypes in 2024.

Articles: https://spacenews.com/dod-signaling-demand-for-satellite-support-services-in-geostationary-orbit/

https://spacenews.com/orion-space-wins-u-s-space-force-contract-for-on-orbit-services-experiment/

NASA and China Like the Same Landing Sites



Credit: NASA

At a news conference held August 19, NASA announced 13 potential landing regions for its Artemis 3 mission, all clustered within six degrees of latitude from the lunar south pole. during a held on Friday (Aug. 19). Each candidate site measures about 15 by 15 kilometers. Meanwhile, the sites mentioned in an article in a Chinese journal as candidates for its Chang'e-7 lander (scheduled for 2024) include sites near Shackleton, Haworth and Nobile craters, all of which are also on NASA's list. The overlap is unsurprising; both NASA and China want sites with high elevation and good lighting conditions for conducting mission activities, and which are also close enough to permanently shadowed craters thought to have trapped water-ice.

Articles: https://spacenews.com/nasa-selects-potential-lunar-landing-sites-for-artemis-3/

https://www.space.com/astronauts-moon-landing-artemis-3-candidate-sites

https://spacenews.com/nasa-and-china-are-eyeing-the-same-landing-sites-near-the-lunar-south-pole/

South Korea’s Lunar Ambitions

Credit: Korea Aerospace Research Institute

At an August 24 public hearing organized by the Korea Aerospace Research Institute (KARI), the Institute announced that it is seeking funding for a $459 million project to build a 1.8-ton robotic lunar lander, to be launched in 2031 for a one-year mission on Korea’s next-generation carrier rocket, now under development. The lander would carry a small rover and a very small (0.75 kg!) nuclear power generator. A bold plan for a nation whose first lunar orbiter, called Danuri, hasn’t even made it to the moon yet.

Article: https://spacenews.com/south-korea-seeks-459-million-for-lunar-lander-project/

Precedent

Credit: Astrobotic

Orbit Fab's core business is in-space refueling of spacecraft, but it has wider interests. It recently announced plans to purchase an unspecified but small amount of lunar regolith from a third party and transfer it to a trust to promote sustainable management of lunar resources. On July 26 Orbit Fab announced that it signed a letter of intent with Breaking Ground, a trust established last year seeking to develop approaches for managing lunar resources, to do this. Under the agreement, Orbit Fab will purchase lunar regolith from another company and donate it to Breaking Ground to hold in trust. Breaking Ground aims to create precedents for the transfer of lunar resources and help mature approaches for management of those resources. This is similar to NASA's purchase contracts for token amounts of regolith from four commercial companies, announced in the last days of the Trump administration, and for the same purpose: establishing precedent for the commercial extraction of lunar materials.

Article: https://spacenews.com/orbit-fab-to-donate-regolith-to-lunar-resources-trust/

https://spacenews.com/nasa-selects-four-companies-for-lunar-sample-purchases/

Help Me Make It Through the Night

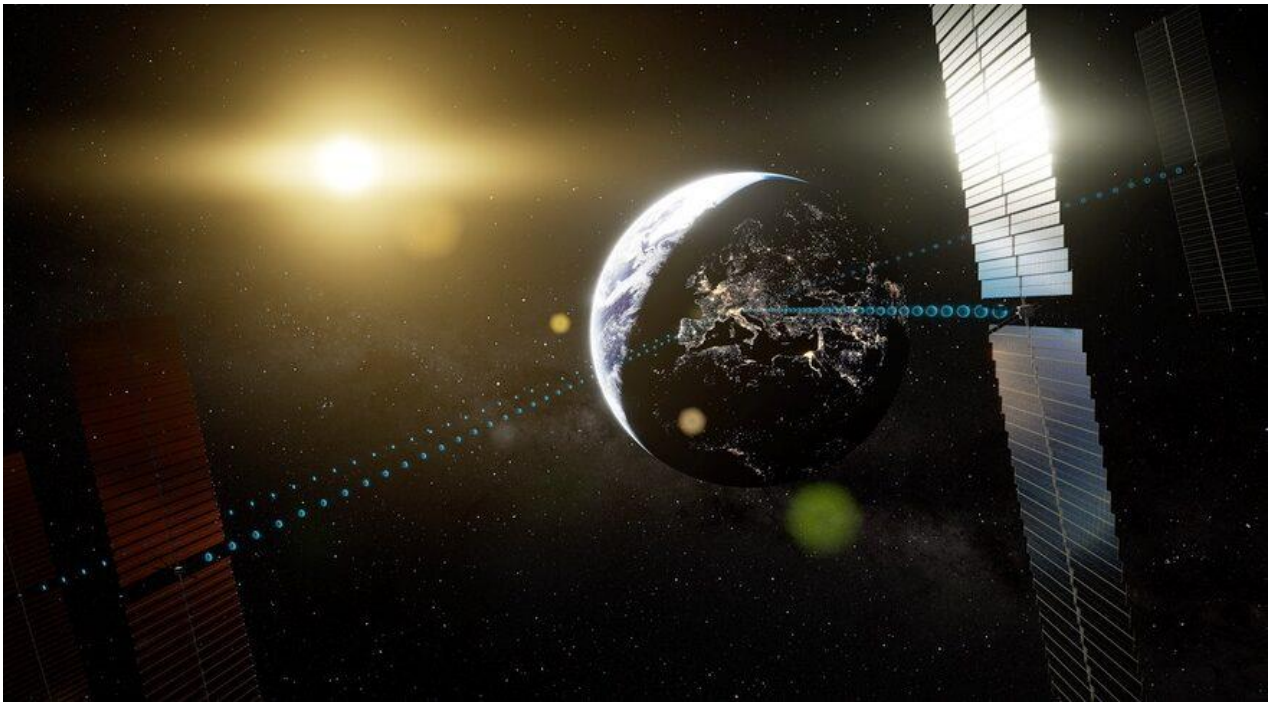
Credit: Astrobotic

Astrobotic announced on August 24 that it won NASA funding through the agency's Small Business Innovative Research (SBIR) program to develop a small CubeRover and fly it on a future Astrobotic lunar lander, perhaps by 2025. CubeRover has two goals: first, to demonstrate the ability to survive the frigid 14-day lunar night, and second, to demonstrate its ability to communicate with lunar relay satellites rather than through a lander. That would increase the range of the rover, removing the need to remain within line of sight of the lander to maintain comm. Value of the award has not been released, but it's small, since it's one of six SBIR Sequential Phase 2 awards NASA announced in August with a combined value of just $27M. CubeRover has a 1 kg. payload capacity that Astrobotic is offering commercially.

Articles: https://spacenews.com/astrobotic-wins-nasa-funding-for-cuberover-mission/

https://www.space.com/astrobotic-cuberover-lunar-night-survival-mission

ESA Studies Space Solar Power



Credit: ESA/Andreas Treuer

In a recent tweet, ESA director general Josef Aschbacher said he will ask member states at this November's ministerial meeting to fund a preparatory program for space-based solar power called Solaris. Solaris would be a three-year study to address technical issues associated with SBSP, to support a decision at the next ministerial meeting in 2025 on whether to proceed with a full-fledged SBSP development effort. Two recent cost-benefit studies by consulting firms Frazer-Nash in the United Kingdom and Roland Berger in Germany both concluded SBSP has the potential to meet European energy needs while supporting the European Commission's goal of "net zero" emissions by 2050. Meanwhile, the U.K. has its own plans for SBSP by 2035.

Articles: https://spacenews.com/esa-to-request-funding-for-space-based-solar-power-study/

https://www.space.com/europe-space-based-solar-power

https://www.space.com/space-based-solar-power-plant-2035

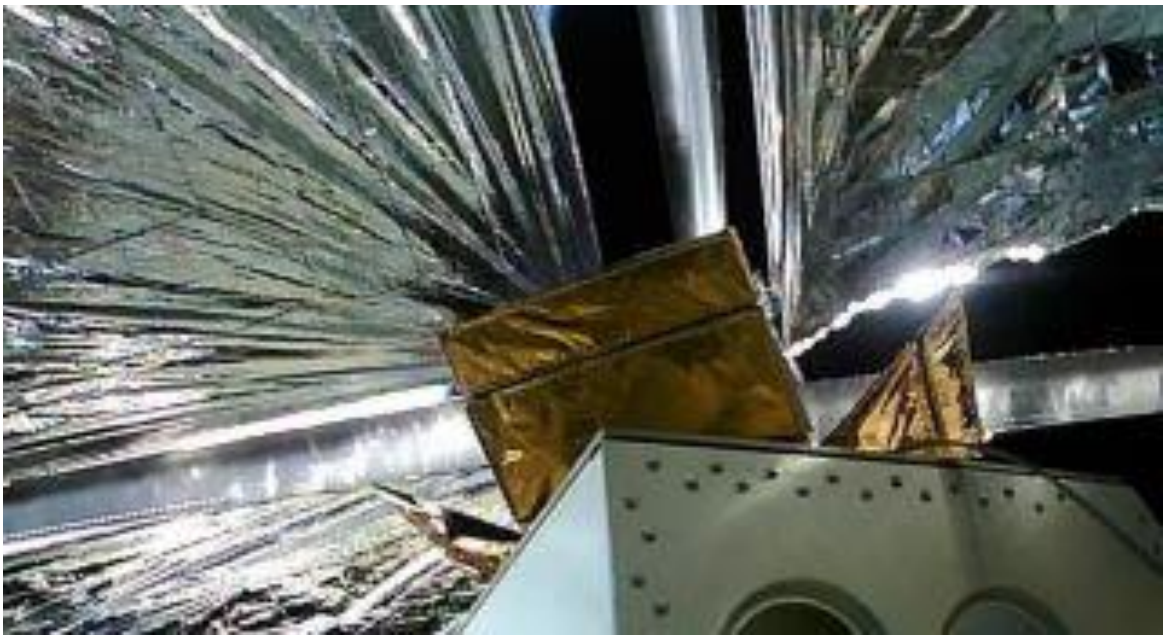
Taking Russia Out of the Supply Chain

Credit: Firefly Aerospace

Northrop Grumman has completed first stages for only two more Antares launch vehicles, which it uses to boost its Cygnus supply capsules to ISS. When those are used, it won't have any more first stages; Ukraine's Yuzhnoye State Design Office and Yuzhmash Machine Building plant builds them, and they're powered by RD-181 engines from Russia's NPO Energomash. So NG needs a replacement – fast. Behold the Antares 330, a joint effort between NG and Firefly, which they hope to have ready to fly as soon as 2024. The new first stage will use Firefly composites for its structure and tanks, and seven Miranda engines under development by Firefly will provide the thrust. To cover the gap between the last launch of the old Antares and the new version, NG is buying three SpaceX Falcon 9 launches for Cygnus.

Article: https://spacenews.com/northrop-grumman-and-firefly-to-partner-on-upgraded-antares/

Deploy the Drogue 'Chute



Credit: SAST

On June 24, China launched a Long March 2D rocket from Xichang Satellite Launch Center in southwest China, placing three Yaogan 35 series satellites into orbit. The Shanghai Academy of Spaceflight Technology (SAST), the rocket's maker, used this flight to test a new method of bringing down space debris faster. A 269-square-foot (25 m^2) deorbiting sail attached to the payload adapter on the rocket's upper stage was unfurled a day after launch. The goal is use the sail to help deorbit the 661 lb. (300 kg) adapter from its current orbit at an average altitude of 305 miles (491 km) within two years, significantly faster than the rocket's upper stage, which has no such speed brake.

Meanwhile, Kall Morris Inc. announced on September 7 that it has received three study contracts worth $750K for debris-cleanup technologies under the Space Force's Orbital Prime program, administered by SpaceWERX, the technology arm of the U.S. Space Force. Companies participating in Orbital Prime hope the program will lead to an actual debris-removal mission and a commitment from the U.S. government to buy cleanup services from private companies.

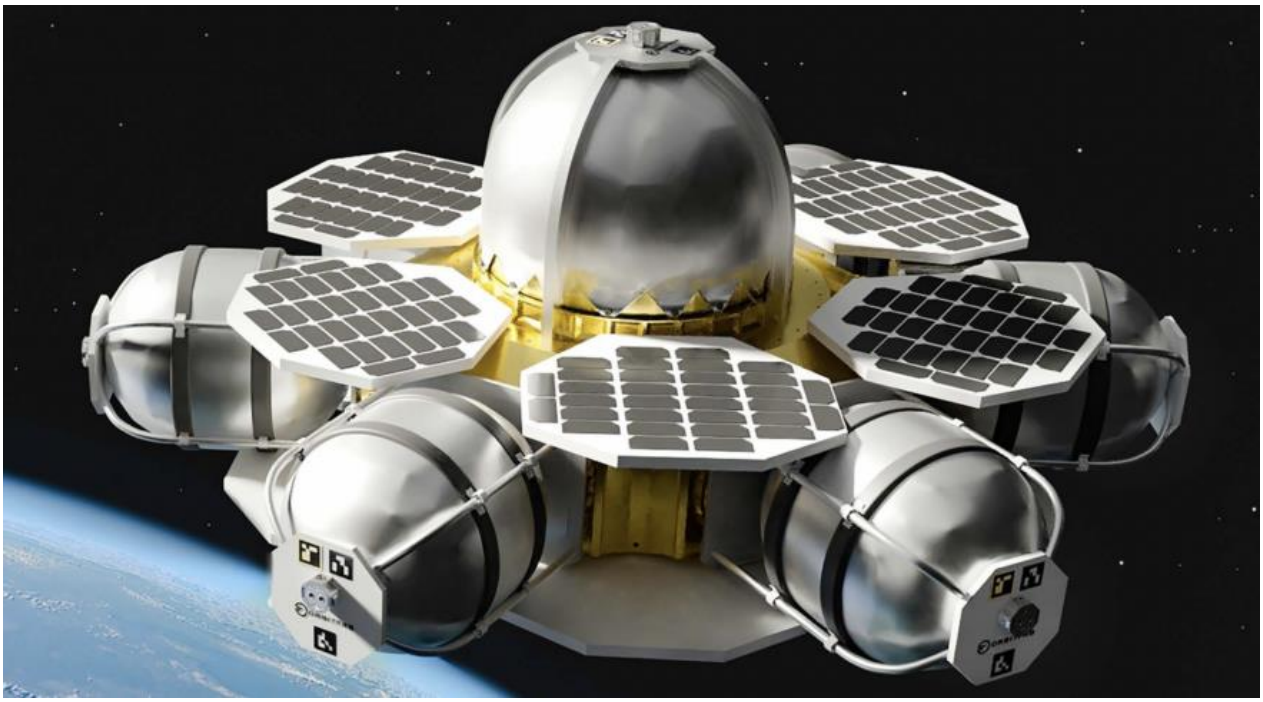
Finally, fresh off a failed attempt last month to catch a simulated piece of debris in orbit, Astroscale announced it's partnering with broadband satellite provider OneWeb to launch another test mission called ELSA-M mission (End-of-Life Service by Astroscale-M)ready in late 2024, and aims to provide commercial debris removal service by 2030.

Articles: https://www.space.com/china-deploys-drag-sail-space-junk

https://spacenews.com/kmi-wins-three-space-force-study-contracts-for-debris-cleanup-technology/

https://www.space.com/astroscale-test-mission-satellite-2024

In-Space Refueling Coming Soon



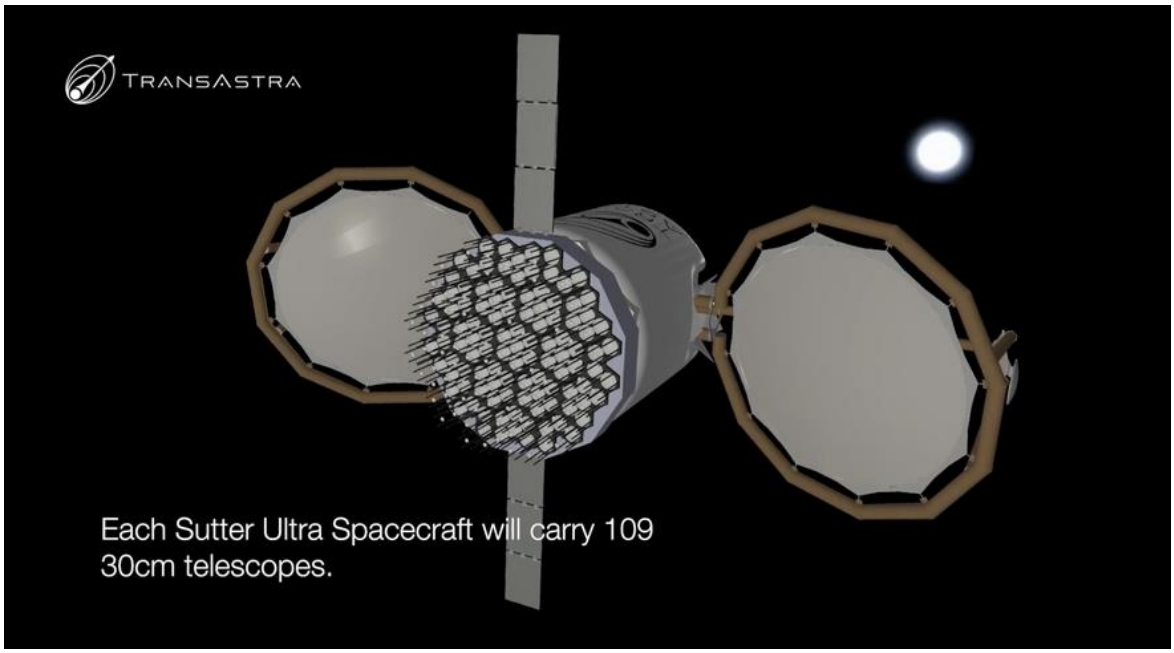
Credit: Orbit Fab

Orbit Fab co-founder Jeremy Schiel says Orbit Fab wants to start offering hydrazine refueling to satellites in GEO by 2025. The company plans to place a fuel depot in a "service lane" orbit about 300 kilometers above GEO, between the active belt of GEO satellites and the graveyard orbit of defunct GEO satellites, and use a fuel shuttle to get the fuel from the depot to its GEOsat customers. Its price point is $20M for up to 100 kg of hydrazine. Astroscale, which plans to launch its first GEOsat servicing spacecraft known as LEXI (Life Extension In-Orbit), announced an agreement with Orbit Fab in January to buy up to 1,000 kg of Xenon propellant to refuel LEXIs, thus extending the life of satellites which exist to extend the life of other satellites.

Article: https://spacenews.com/orbit-fab-announces-in-space-hydrazine-refueling-service/

https://spacenews.com/orbit-fab-secures-deal-to-refuel-astroscales-in-space-servicing-robots/

Space-Based Telescopes for Students

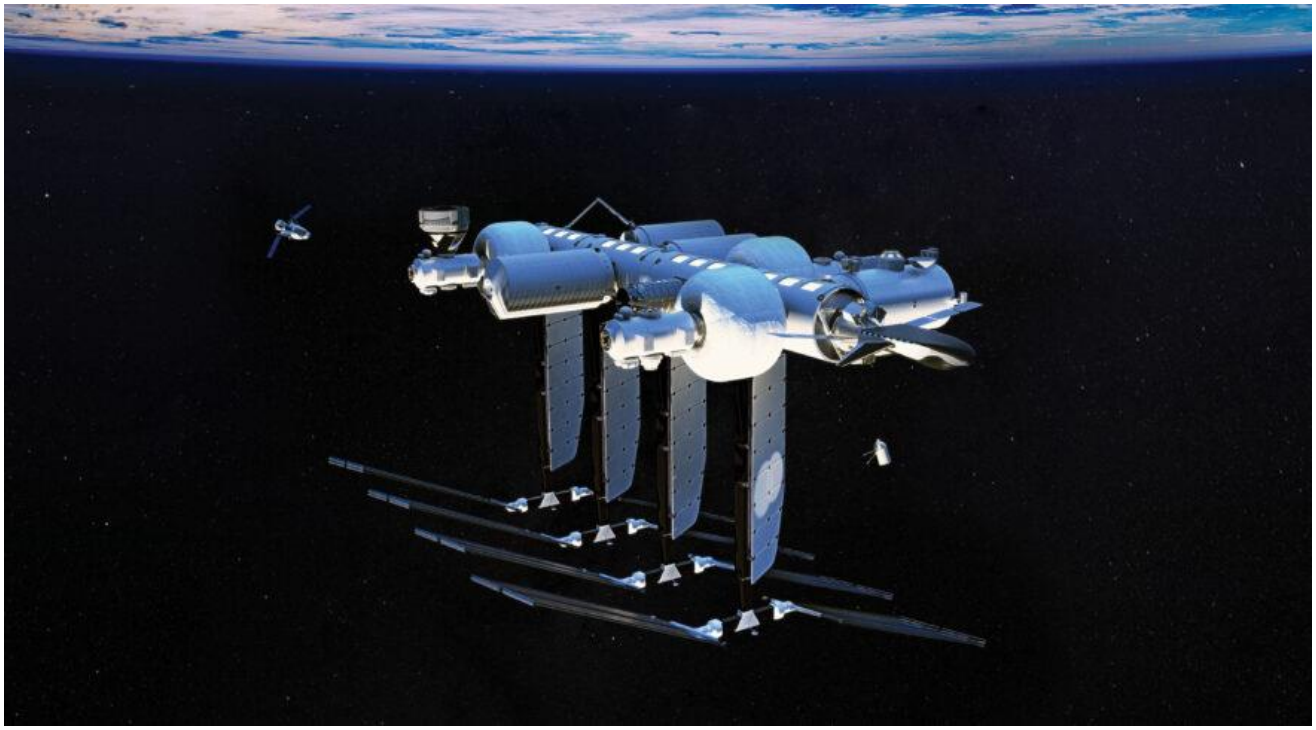


Credit: TransAstra

Space logistics startup TransAstronautica has announced a partnership with online astronomy platform Slooh to offer U.S. schools access to a global network of ground-based and space-based telescopes. TransAstra is a Los Angeles startup focused on orbital logistics and space mining; it developed the Sutter telescope to survey asteroid minerals. Two of them are already deployed at observatories in Arizona and California. In addition to the ground-based telescopes, TransAstra and Slooh plan to launch a small commercial telescope within two years.

Articles: https://spacenews.com/transastra-and-slooh-to-offer-students-asteroid-detection-tool/

It's a Long, Hard Road…



Credit: Blue Origin/Sierra Space

…to commercial space stations. Per an announcement by Blue Origin and Sierra Space on August 22, their Orbital Reef commercial station passed a system definition review (SDR) with NASA. Orbital Reef is one of three proposed commercial space stations that received funded Space Act Agreements from NASA in December as part of the Commercial Low Earth Orbit Destinations (CLD) program. Besides $130M for Orbital Reef, a team led by Nanoracks won $160M for its Starlab station and Northrop Grumman received $125M for its design. Axiom Space has a separate agreement with NASA to attach commercial modules to ISS that will later detach to form the core of an independent space station. NASA expects its transition to private stations will result in savings of $1.3B in 2031, increasing to $1.8B in 2033. It published a transition plan in February (which took little account of the needs of its ISS partners), but members of the Aerospace Safety Advisory Panel say they're concerned that the CLD-supported stations are unlikely to be ready in time for the ISS planned retirement in 2030, and that progress on those efforts is hampered by insufficient budgets. NASA and its commercial partners disagree; Sierra Space plans to launch its first module in 2027.

Articles: https://spacenews.com/nasa-safety-advisers-warn-iss-transition-plans-on-precarious-trajectory/

https://spacenews.com/nasa-companies-reject-concerns-over-commercial-space-station-development-schedules/

https://spacenews.com/orbital-reef-passes-nasa-review/

https://www.space.com/nasa-international-space-station-plan-final-years-2030

https://spacenews.com/nasa-outlines-cost-savings-from-iss-transition/

https://spacenews.com/iss-transition-to-commercial-stations-poses-challenges-for-partners/

Another Early Launch Contract for Starship

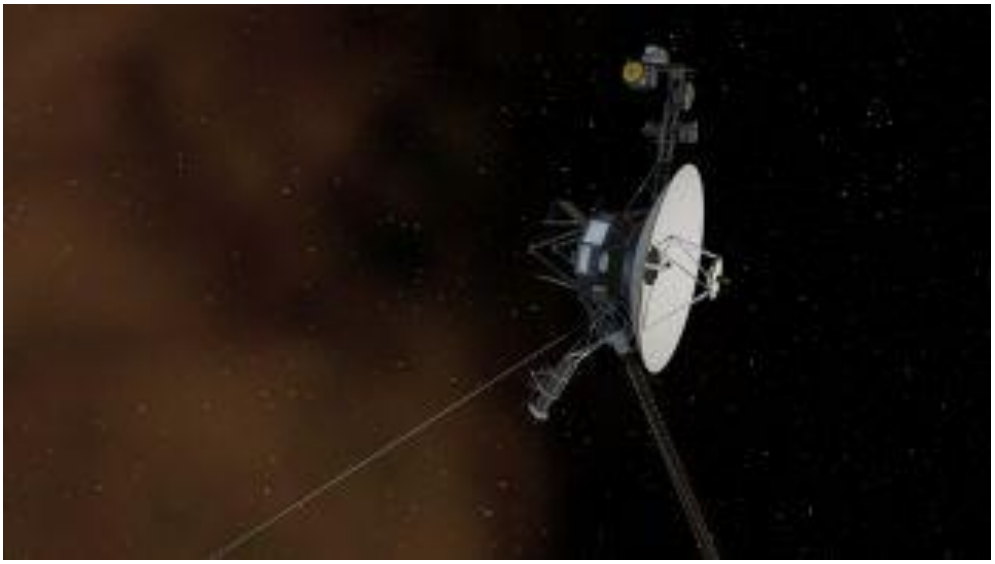
Credit: SpaceX

Sky Perfect JSat has chosen Starship to launch its Superbird-9 communications satellite to GTO in 2024. It's one of the first commercial contracts for SpaceX's HLV, aside from all the self-subscribed launches of Starlink satellites, and the minor matter of Artemis 3. Still no announced date for Starship's first orbital launch attempt…

Articles: https://spacenews.com/sky-perfect-jsat-picks-spacexs-starship-for-2024-satellite-launch/

https://www.space.com/spacex-starship-communications-satellite-launch-contract

Well Out of Warranty, but Not Dead Yet



Credit: NASA/JPL-Caltech

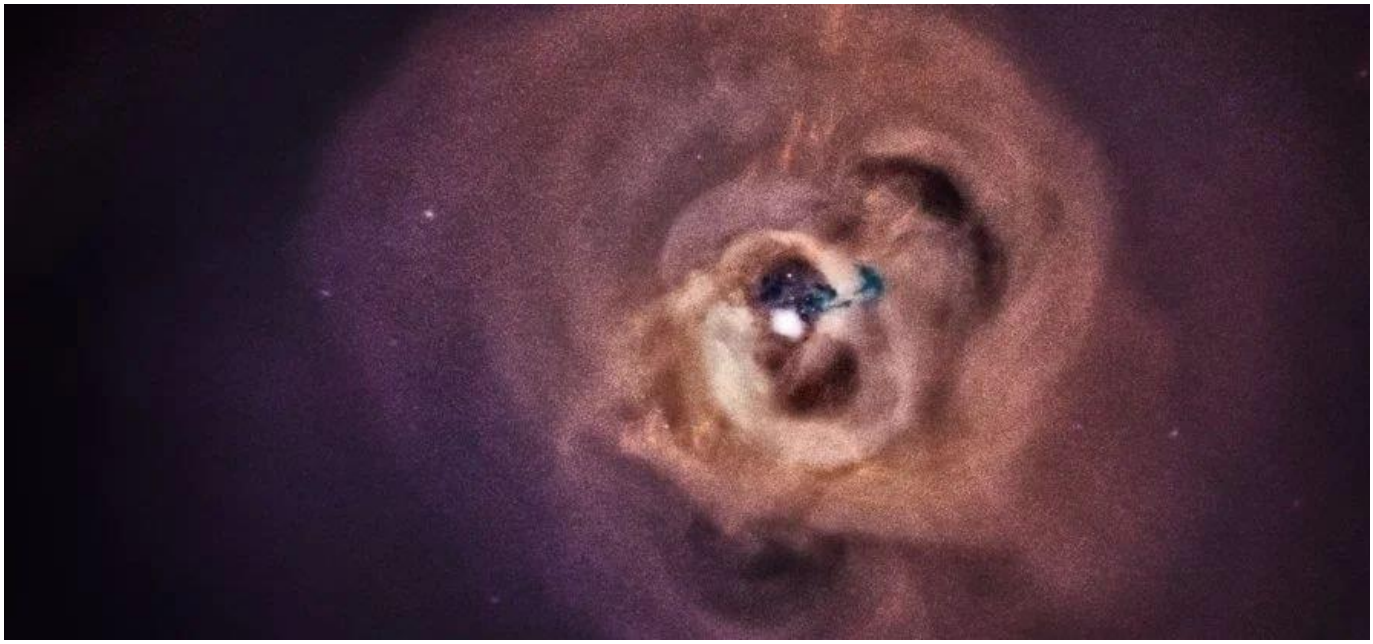
We've just passed the 45th anniversary of the launch of the Voyager probes, August 20, 1977 for Voyager 2 and September 5, 1977 for Voyager 1. Voyager 1 was launched on a faster trajectory and passed its twin early on; it's now at 157 AU (14.6 billion miles), and Voyager 2 is "only" 130 AU (12.1 billion miles) out. Power from the RTGs is getting marginal. "It takes about 200 watts, approximately, to run the transmitter on the spacecraft, to be able to send signals back to Earth, and we're at a power level currently where we only have about five to six watts of power margin on each spacecraft," Voyager Interstellar Mission project manager Suzanne Dodd, who also serves as the director for the Interplanetary Network Directorate at NASA's Jet Propulsion Laboratory (JPL) in California, told Space.com. They have maybe five years left before they fall silent, ten if they're lucky.

Articles: https://www.space.com/voyager-spacecraft-power-update-july-2022

https://www.space.com/voyager-1-45-year-launch-anniversary

https://www.space.com/nasa-voyager-2-spacecraft-billion-year-legacy

Sights and Sounds



Credit: NASA/CXC/SAO/E.Bulbul, et al.

NASA has released an audio clip of sound waves rippling out of a supermassive black hole at the center of the Perseus cluster of galaxies, some 250 million light-years away. The acoustic waves coming from this black hole have been transposed up 57 and 58 octaves to make them audible to human hearing. Some folks on Twitter called it the sound of hell; this seems a tad overwrought. Much closer to home, from her perch aboard ISS ESA astronaut Samantha Cristoforetti recently stunning images of the aurora australis, AKA the southern lights. "The sun has been really active lately," she wrote in a tweet on August 21. "Last week we saw the most stunning auroras I have ever experienced in over 300 days in space!"

Articles: https://www.space.com/aurora-australis-photos-from-space-station

https://www.sciencealert.com/nasa-recorded-the-sound-from-a-black-hole-and-its-super-eerie

This Week At NASA

Videos: https://www.nasa.gov/multimedia/podcasting/twan_index.html

That's All Folks

Credit: NASA